ENVIRONMENT

Introduction

The environment is the sum of all parts; it encompasses our entire surroundings, the land we live on, the air we breathe, and the water we drink. Blessed with lush vegetation, 207 miles of shoreline, rolling hills, and bluffs, York County is an area of great natural beauty. It is also an area where these and other natural features pose many challenges to development. Development regulations in York County seek to encourage the proper use, management, and protection of sensitive and unique lands and waterways in the County that contribute to the economy of the region and the environmental quality of the County. They are not necessarily meant to preclude development or use of these areas but rather to ensure that any development that occurs is undertaken in recognition of environmental qualities and conditions.

Since the adoption of York County's *Comprehensive Plan* in 1991 and the revised Zoning Ordinance in 1995, which was the subject of wide public discussion, the projected build-out population of the County was significantly reduced. While these changes will have a positive impact on the environment there are issues at both the state and federal level that have the potential to affect future development in the County

CLIMATE

York County's climate is generally mild, with average temperatures of 39.5^{o}F in January and 78^{o}F in July. The growing season is 190 days long and the annual rainfall averages about 44 inches and does not vary significantly from month to month. Average annual snowfall is six inches (6"). Prevailing winds are southeasterly.

AIR QUALITY

Air quality is regulated through implementation of the federal Clean Air Act, first passed by Congress in 1970 and amended in 1990. This legislation is reflected in regulations promulgated by the U.S. Environmental Protection Agency (EPA) and enforced by the individual states. In Virginia, these regulations are enforced by the Department of Environmental Quality (DEQ), which, pursuant to the Air Pollution Control Law of Virginia.

The Air Pollution Control Law of Virginia gives the DEQ with the legal authority to carry out state air quality programs established by the State Air Pollution Control Board determines to protect public health and welfare. It also provides the authority to carry out federally mandated air quality programs. Virginia's Air Pollution Control Law is very broad and gives the State Air Pollution Control Board considerable latitude in developing regulations. It generally provides minimal guidance on the content of the regulations or other substantive aspects of programs. Together with state law, the federal Clean Air Act and its implementing regulations provide the authority for the department to develop air quality programs mandated at the federal level. They usually specify, in great detail, the requirements for an air quality program. State air quality programs developed under the authority of the federal Clean Air Act must be approved by the EPA.

In accordance with the Clean Air Act, air quality is monitored throughout the state for compliance with the National Ambient Air Quality Standards (NAAQS). The NAAQS, which are set by the EPA after years of analysis and with the review of EPA's Science Advisory Board, establish maximum limits of "criteria pollutants" that are allowed to be emitted to the ambient (outside) air. The criteria pollutants are ozone (O_3), nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), lead (Pb), and particulate matter (PM10). Areas that meet these standards are classified as attainment areas, while those that fail to meet one or more of the NAAQS are classified as non-attainment areas. A third category – maintenance area –applies to

any geographic region previously designated as a non-attainment area and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan.

The EPA requires that each state submit a State Implementation Plan (SIP) to show how air pollution will be reduced to levels at or below the NAAQS and how the state will maintain air pollution at the reduced levels. If a state does not submit an acceptable plan, the EPA can develop and implement a plan and impose sanctions. Virginia's SIP was submitted to EPA in early 1972, and more than 100 revisions have been made to the plan since its original submittal. The SIP consists mostly of regulations, as well as permits, emissions inventories, attainment demonstrations, and other related documentation. The overall process of developing the SIP is outlined below:

- Examine air quality across the state.
- Delineate areas where air quality needs improvement.
- Determine the degree of improvement necessary.
- Inventory the sources contributing to the problem.
- Develop a control strategy to reduce emissions.
- Implement the strategy.
- Ensure that air quality standards are not violated in the future.

The key element of the SIP is the control strategy, which describes the emission reduction measures to be used by the state to attain and maintain the air quality standards. There are three basic types of control strategy measures:

1. Stationary source control measures, which limit emissions primarily from commercial/industrial facilities and operations. (In York County, the two major sources of air emissions are Giant Industries' Yorktown Refinery and the Dominion Virginia Power Yorktown Power Station. There are also four federal government facilities that are classified as minor sources.)
2. Mobile source control measures which limit tailpipe and other emissions primarily from motor vehicles, and include federal motor vehicle emission standards, fuel volatility limits, reformulated gasoline, emissions control system anti-tampering program, and the Inspection and Maintenance program.
3. Transportation control measures, which limit the location and use of motor vehicles and include carpools, special bus lanes, rapid transit, commuter park-and-ride lots, bicycle lanes, and signal system improvements. These are generally included as commitments in plans and do not require individual regulations.

Non-attainment areas are required to form local planning organizations (LPOs). The purpose of the LPO in a non-attainment area is to assist the DEQ in carrying out planning requirements for that area. These planning requirements can include examining baseline emissions levels to determine necessary control strategies, examining transportation needs for future growth, and if necessary, creating plans for EPA review and approval to bring the area into attainment with the air quality standards. The extent of the planning requirements depends greatly on the classification of the non-attainment area and the severity of the air pollution problems.

York County is part of the Hampton Roads Air Quality Region, which was classified as a marginal non-attainment area for ozone in 1991, then reclassified as a maintenance area in 1997 based on three years of quality-assured ambient air monitoring data for the area, which demonstrated that the NAAQS for ozone had been attained. In 2004, however, the EPA once again classified the region as a marginal non-attainment area as a result of the EPA's promulgation of a new 8-hour standard for ozone. The Hampton Roads Air Quality Committee serves as the LPO for the region and includes elected or appointed officials from each locality in the region, including York County, as well as representatives of the Virginia Department of Transportation (VDOT) and the Virginia Department of Rail and Public Transport (VDRPT). Representatives of the Hampton Roads Planning District Commission, the U.S. Army

Environmental Center, the Virginia Port Authority, and the Northeast Region Installation Management Agency also participate in an advisory capacity. The DEQ will develop a SIP to address the actions that will need to be taken to bring the area into attainment by June 2007.

LAND

Topography

The topography of land in York County varies from generally low, flat land with high water tables in the lower County to rolling terrain with well-drained soils in the northern reaches at elevations of up to 130 feet. The Steep Slopes map shows those areas in the County with slopes greater than 20%, which are subject to potential erosion if not adequately protected during the course of any development activity. Construction of roads, driveways, structures, and other land disturbing activities in these areas are not allowed unless no other practical option exists. New construction on existing slopes in excess of 30% is generally prohibited except in certain unusual circumstances.

Soils

There are six main soil categories in the County as defined by the Virginia Soils Conservation Service. The different soils types dictate limitations on construction techniques required for successful development in each area. A significant issue that has surfaced in the past several years has been testing and construction requirements associated with shrink-swell soils. To date there have been no major problems in York County but both James City and Chesterfield Counties have experienced major shrink-swell issues.

The County contains soils types that are conducive to agricultural use, but, for economic reasons, farming of land is often an interim use until the land can be developed for more profitable uses. The County's land use assessment program provides tax relief for much of this type of property, including qualifying lands dedicated to agricultural or horticultural use.

As shown on the High Water Table map, a significant portion of the County has a high water table, which is defined as being within 2½ feet of the ground elevation. In addition, much of this high water land has been classified as hydric, which means that it stays saturated for enough time during the growing season to develop anaerobic conditions. This soil characteristic is significant in making wetland determinations.

With few exceptions, the entire County is generally characterized by soils with severe limitations for septic systems. The suitability of soils for supporting a properly functioning septic system is dependent on a variety of factors including lack of topographic relief, susceptibility to severe wetness, flooding potential, percolation (permeability) rate, and filtering characteristics. System failures have been reported by the Health Department in various areas of the County; however, they should not be construed as an absolute indication that septic systems will not function properly in a particular area. For site-specific conditions, on-site surveys and samples must be obtained. The combined characteristics of a high water table, slope, permeability, and flood potential make the proper functioning of septic tanks difficult in the lower County. Periodically the Health Department conducts a "shoreline sanitary survey" of the County and, where on-site deficiencies are identified, the property owner is notified of the violation. Follow-up inspections are conducted by the local Health Department to ensure that corrections are made to the system.

Erosion and Sedimentation Control

Adequate erosion control measures will minimize off-site sediment transport and, because sediments also pick up phosphorus and nitrogen, such control results in the reduction of nutrients to the receiving waters. The County's Erosion and Sediment Control Ordinance,

amended and re-adopted in 1991 and then rewritten in 2002, requires that all land disturbances greater than 2,500 square feet meet state standards relative to the installation of control systems such as silt fences, straw bales, sediment basins, and check dams to control soil loss.

The Colonial Soil and Water Conservation District provides assistance to Peninsula localities on the conservation of soil, water, and related natural resources. The District staff also works with the agricultural community in preparing conservation plans and advising farmers on proper land management. In 1990 the County and the District formalized this working relationship with a Memorandum of Understanding, which provides for the Soil Conservation District to 1) assist the County with erosion and sediment control programs; 2) provide education on natural resource conservation; and 3) assist in developing ordinances, policies, and plans for managing soil, water, and natural resources. A member of the York County Board of Supervisors is appointed as a liaison representative to the District to ensure joint coordination of soil conservation efforts.

WATER QUALITY

Water quality is a critical issue for every community but particularly for York County because of its location and topography. Not only is water an important resource in terms of providing drinking water, it also provides important recreational, aesthetic, and economic benefits to the County and its citizens. The regulation of surface and ground water involves many federal, state, and local programs. These regulations are directed mainly at three targets: point sources such as end-of-pipe discharges and underground storage tanks; nonpoint sources such as stormwater runoff; and nontidal and tidal wetlands. All of these sources together contribute to the level of water quality in the Chesapeake Bay, the York River, and all of their tributaries.

York County, for the most part, enjoys high-quality water in both its fresh water and brackish water systems. The protection of water systems in Virginia is the responsibility of the State Water Control Board and its regulatory agency, the Department of Environmental Quality, and to some extent the State Board of Health. Some specific issues relating to these systems are discussed below.

Fresh Surface Water

Surface water impoundments, all of them owned by other jurisdictions, are the major source of drinking water in York County. The five surface water impoundments used as reservoirs for drinking water that are located completely or partially in the County are listed below:

- Lee Hall Reservoir (owned and operated by the City of Newport News)
- Harwoods Mill Reservoir (owned and operated by the City of Newport News)
- Waller Mill Reservoir (owned and operated by the City of Williamsburg)
- Big Bethel Reservoir (owned and operated by the Federal Government for Langley Air Force Base)
- Jones Pond (owned and operated by the Federal Government for Cheatham Annex but no longer used as a drinking water supply)

Because the quality of surface water is directly related to land use, York County established the Watershed Management and Protection Area (WMP) overlay zoning district in 1985. The provisions of the WMP overlay district are intended to ensure the protection of watersheds surrounding current and potential public water supply reservoirs. The regulations seek to prevent the degradation of reservoirs from the operation or accidental malfunctioning of the use of land or its appurtenances within the drainage area of water sources. The WMP provisions require that a 200-foot vegetated buffer be maintained from the edge of any reservoir or tributary stream. They also prohibit certain uses, such as feedlots, septic drainfields, and landfills, within 700 feet of reservoirs and their associated tributary streams. Storage of hazardous wastes is specifically prohibited throughout the district. In addition to limiting land

use, the regulations require an impact study addressing water quality to ensure that post-development runoff does not exceed pre-development rates or quality. With the 2004 revisions to the Chesapeake Bay Preservation Act (CBPA), the reservoirs are afforded an even greater degree of protection by the CBPA regulations.

The water quality in all of these reservoirs is high with the exception of the Big Bethel Reservoir, where urbanization and development have diminished the water quality. The federal government has recently constructed a new water treatment facility at Big Bethel to provide high-quality potable water through treatment.

Ground Water

Ground water is directly related to surface water and is itself an important drinking water source. It is contained in the saturated pore spaces of sediments beneath the surface of the Earth. The underwater formations that yield water to wells are called *aquifers*. They store, disperse, and transmit water. Groundwater is replenished by precipitation on the land surface or downward seepage of water through overlying beds.

The amount of water an aquifer contains depends on the porosity and permeability of the surrounding soils. Porosity refers to the amount of open space (voids) between the sands, silt, and gravel. Permeability is the ability of the soil to transmit water through the aquifer material. Sandy and gravelly soils can hold large amounts of water because there are larger and more connected spaces between the particles. Clay soils, on the other hand, have small spaces that are not connected, making water passage difficult. Annual recharge to the groundwater system from precipitation is approximately ten inches per year in the York County area.

The ground water flow system in the Coastal Plain is a multi-aquifer system generally flowing from west to east. Studies have identified at least seven major aquifers – three shallow and four deep – in York County. Generally, the oldest aquifers are the deepest.

In general, there are six hydrogeologic units comprising the shallow aquifer system, three aquifers and three confining layers. The Columbia aquifer is the County's uppermost and is unconfined, its upper limit being the seasonally variable water table and its depth being at least five feet (5'). It is not the aquifer of choice for potable water because of its relatively low yields, poor water quality, and susceptibility to contamination. There are some very shallow wells in the County (9') still being used for potable water in older neighborhoods.

Of the deep aquifers, the Chickahominy-Piney Point aquifer, characterized by black and white sands interspersed with shells and dark, silty clay, is important to York County in that it is used by the five wells for public water distribution. This aquifer is also used by industry in West Point and Franklin and lies approximately 150 to 400 feet below mean sea level. Below this aquifer is the Aquia Aquifer, which is not utilized much in eastern Virginia because the deposits are fine-grained and commonly contain a limy mud matrix and thin limestone beds. Deeper still is the Upper Potomac Aquifer, capable of producing large quantities of good water suitable for most uses. The two lowest aquifers, the Middle and Lower Potomac, also are capable of supplying large quantities of water but are generally too deep for all but major industrial and municipal applications.

York County has three production wells that serve the Skimino/Banbury Cross residential communities in the upper County and has recently installed two additional production wells to service the Lightfoot Corridor for future commercial and light industrial development. The installation of the Lightfoot wells was approved by the SWCB and a minimal one-time draw-down of the water table with the wells at approved production was indicated by computer modeling. The DEQ has designated York County as part of a ground water management area and major withdrawals (more than 10,000 GPD) require approval by the State Water Control Board (SWCB). The SWCB has authorized the withdrawal of 24.9 million gallons per year

(68,219 GPD or 0.069 MGD) from the three wells comprising the Skimino Hills/Banbury Cross system. The depths of these wells, which are pumping an average of almost 57,000 GPD, range from 283 to 324 feet. The two wells that make up the Lightfoot system are authorized to withdraw 204.4 million gallons per year (560,000 GPD or 0.56 MGD). These wells are pumping an average of 30,567 GPD and are 310 and 318 feet deep.

The overall natural quality of the groundwater in Hampton Roads is high. Large-scale human-induced contamination of the region's aquifers is not a problem. The major threats to groundwater quality are inefficient septic systems; leaky underground storage tanks; spills and improper disposal of hazardous material; leaky surface water impoundments; leaky landfills; improper pesticide and fertilizer application; and pumping induced saltwater encroachment. The most vulnerable aquifer in the County is the Columbia since it is shallow and unconfined. Deeper aquifers can be contaminated from downward migration, and the health and economic impacts on a community can be high. It is imperative, therefore, that groundwater be protected.

In compliance with the Safe Drinking Water Act, York County is required to test for over a hundred contaminants and produce an annual Consumer Confidence Report to document the quality of the drinking water distributed to customers via the County's distribution systems in the Skimino Hills, Banbury Cross, and Hubbard Lane areas. Testing conducted in 1998 detected only four contaminants (copper, fluoride, gross alpha, and gross beta), all of which were well within permissible ranges.

In addition, the Virginia Department of Health monitors wells and water supply systems serving 15 or more connections and systems serving more than 25 persons for more than 60 days of the year. Community wells and systems have quarterly testing and reporting requirements. Local Health Departments monitor non-community and non-transient wells. They also process the permits for private wells and administer the State's Private Well Regulations, which are intended to ensure that private wells are located, constructed, and operated in a manner that does not adversely affect public safety, health, or groundwater resources. The local Health Departments do not monitor, inspect, or track abandoned wells. Because improperly abandoned wells are a possible point of aquifer contamination, York County has an interest in assisting the Health Department to establish a database of abandoned wells and ensuring their proper closure. According to both the Williamsburg and Newport News offices of the Health Department, there have been no reports or complaints of saltwater intrusion into private wells in York County.

In 1999 the EPA required all state health departments to assess wells within their jurisdiction to identify aquifer contamination from surface runoff. The well serving the Captain John Smith Lodge on Richmond Road had experienced some poor test results and was therefore tested by the local Health Department for the required duration. It was determined that the well was not contaminating the aquifer via surface runoff.

Groundwater consumption in York County via the public distribution system will likely increase over time. The Skimino wells are pumping at 83% of their capacity, but the Lightfoot wells are at only 0.5% of capacity. When these two systems are connected, additional connections will be permitted in the Banbury Cross and Old Quaker Estates area. As Lightfoot-area commercial consumers are added to the system, it will be necessary to augment the system with additional water. Ultimately the County plans to turn these groundwater-based distribution systems over to Newport News Waterworks.

Although public water hook-up in the County is not mandatory, the number of private wells used for potable water is decreasing. All *new* construction must use public water if it is available, and as capital improvement projects continue to bring public water to existing neighborhoods, more residents are abandoning private wells in favor of the public water system. Neighboring localities have adopted ordinances requiring existing residences to connect to the public water system in the event of private well failure.

Most of the groundwater in the County distributed for drinking water comes from the Chickahominy-Piney Point aquifer, which is a confined aquifer. The confining units between the aquifers limit the movement of pollutants into the water supply, hence the majority of groundwater from wells in the County is afforded a significant level of protection from contamination. However, an unknown number of private wells in the County are withdrawing water from the unconfined surficial aquifers. Because of the lack of confining units, pollutants from the land's surface, underground storage tanks, or sanitary septic drainfields can move freely into the groundwater.

There are six landfills in the County, three of them active and three closed. The Virginia Department of Environmental Quality regulates landfills to prevent contaminants from leaching into groundwater.

Military installations (current or former) in the County have documented soil and groundwater contamination problems. The State owned property at the intersection of Penniman Road and the Colonial Parkway (formerly part of Cheatham Annex) contains a defunct fuel farm and soils that are contaminated with fuel and solvents. The Naval Weapons Station contains a Superfund site that, according to the EPA, has been contaminated with polychlorinated biphenyls (PCBs), explosives, contaminated wastewater, organic solvents, and other material involved in the testing and manufacture of explosives. There is no evidence of contaminated groundwater leaving either facility. York County will continue to monitor these situations as federal studies of the problems continue.

There are currently nine open cases of leaking underground storage tanks in the County that are being monitored and regulated by the DEQ through the LUST (Leaking Underground Storage Tank) program. Four of these cases are located at the Giant refinery and two on local military bases. Although inclusion in this list does not necessarily mean there is an active leak, it does mean that steps required to clean up the site are underway.

The Department of Health routinely conducts Shoreline Sanitary Surveys to identify and evaluate sources of pollution that have the potential to contaminate shellfish. The focus is on surface water pollution, but some of the information is also pertinent to an evaluation of groundwater conditions, especially relating to shallow unconfined aquifers. One such survey identified ten houses in the Skimino Hills subdivision that have defective septic systems. Several other homes in this neighborhood are identified as having potential pollution problems. It should be noted that many of the septic tank problems noted by the Health Department either have already been remedied or will be remedied by the year 2005. In 1999, the County received a grant from the Chesapeake Bay Local Assistance Department to map existing septic tanks and initiate a program for septic tank pump-out. Beginning in the year 2000, septic tank owners were notified of the need for pump-out every five years and were required to begin a five-year regular pump-out maintenance program. This program assists in the proper functioning of on-site sewer systems and thus protects the groundwater and surface water. In addition, the County's ongoing program to extend sanitary sewer to low-lying areas and other areas with failing systems (e.g. Skimino Hills is a project area) is based on a priority system driven by environmental and public health needs. Connection to public sanitary sewer in the County is mandatory wherever it is available.

An item of note is that the deeper aquifers have been dropping an average of two feet per year for at least the past twenty-five years. This drop is due primarily to increased production from large ground water users such as the paper mill in West Point and food processing plants on the southwest side of the James River. Many of the homes in the upper County utilize the aquifers and are of an age when this ongoing draw-down is beginning to affect the performance of their wells such that many will require replacement or lowering of the screen areas.

The Hampton Roads Planning District Commission (HRPDC) in cooperation with its Utilities Directors Committee has a comprehensive mitigation program that will fund remediation work that may be necessitated by the installation of water supply wells by member jurisdictions; however, to date, no such issues have surfaced in York County.

Brackish Water

The water quality of the York River and its estuaries located in York County is acceptable for full body contact. According to the Virginia Marine Resources Commission, all of the tidal areas in the County are eligible for shellfish cultivation and growth. However, 13 streams and surface water areas (listed in the box below) have been closed to direct marketing of shellfish by the Virginia Department of Health, Bureau of Shellfish Sanitation, because of high coliform bacteria counts or as a precautionary closure zone around point source discharges such as the power plant outfall. The shellfish harvested in these closed areas must be relayed to warm clean water for at least two weeks prior to marketing.

- Wormley Creek
- Skimino Creek
- Carter Creek
- Queen Creek
- Patricks Creek
- Lambs Creek
- Poquoson River
- Chisman Creek
- Back Creek
- Felgates Creek
- Indian Field Creek
- King Creek
- York River at Cheatham Annex Sewage Treatment Plant discharge and between Sandy Point and Yorktown

Although shellfish information is available from the VMRC, fish habitat information is not. York County is home to many commercial and recreational fisheries that contribute to the local economy. Skimino Creek, which has been stressed very little by the effects of human activities, is a valuable nursery ground for white perch and striped bass. Queen Creek Marsh, which is the largest marsh creek wetland system in the County, is regarded as a major fish nursery and will remain so as long as disturbance is minimized. King and Felgate's Creeks are considered nursery areas for striped bass, white perch, and other species as are the fringing marshes of Indian Creek. Many of these creeks are located at least partly on military installations. Remaining lands adjacent to these creeks that are subject to development must observe water quality requirements for stormwater runoff and the vegetated buffer requirements of the Chesapeake Bay Preservation Act. Studies also have shown that fish populations that spawn in freshwater creeks and migrate to the ocean are highly susceptible to the effects of urbanization, such as flow changes and pollution. Therefore, proper attention should be given to upland and waterfront development in these areas. Requests for dredging or filling in the wetlands and waterways adjacent to these nursery areas should be discouraged.

According to VIMS, there are submerged aquatic vegetation (SAV) beds in certain sections of the York River in York County. Approximately 15,000 acres along the York and Poquoson Rivers were included in the Chesapeake Bay Program's Tier I SAV target restoration area. The Tier I target is to restore SAV to areas currently or previously inhabited by SAV. The Tier III target includes restoration of SAV to all shallow water areas delineated as existing and potential SAV habitat.

York County recognizes SAV beds as critical living resources. Certain types of land activities can contribute excessive pollutants into adjacent waterways, degrade water quality, and thus impact SAV habitats. The intensity of land use and the density of piers can increase or restrict boat traffic along waterways with SAV. Shoreline erosion control structures can also affect SAV beds.

In 1972 the U.S. Congress passed the Federal Water Pollution Control Act. The goal of this act, which later became the Clean Water Act, is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." To achieve this goal, the Act considered only point source discharges, which are regulated through Virginia Pollution Discharge Elimination System (VPDES) permits issued by the State Water Control Board. The Clean Water Act prohibits the discharge of a pollutant into State waters without a VPDES permit. Issuance of a permit requires that industries use the "best available control technology" in order to comply with water quality standards. In York County, VPDES permits have been issued to seven (7) industrial and municipal dischargers for point source discharges to the York River. These facilities meet or exceed federal guidelines established under the Clean Water Act.

VPDES Permits issued in York County
• Giant Refinery
• Dominion Virginia Power – Yorktown
• Cheatham Annex
• Williamsburg Water Filtration Plant
• HRSD York River – Sewage Treatment Plant
• U.S. Naval Weapons Station – Yorktown
• Harwoods Mill Water Treatment Plant

Table 1

In 1987 the Clean Water Act was amended to include non-point sources (i.e., pollution from an indirect source such as stormwater runoff). According to the State Water Control Board, non-point source pollution in the lower York River basin comes from several sources, including "residential, urban, and/or agricultural runoff, failing/inadequate septic systems, natural conditions and drainage and boat pollution from the surrounding public and private boat slips." The loss of protective vegetation and the increase in impervious surfaces (buildings, roads, and parking lots) increases the amount of stormwater runoff and also the levels of pollution and nutrients. In addition to sediment and nutrients, toxins are discharged, adding to the overall stress on the finfish and shellfish population.

The EPA enacted the he National Pollution Discharge Elimination System (NPDES) Phase II program in 1999. York County submitted a stormwater discharge permit for compliance with this program in 2003. The purpose of these regulations is to address non-point source discharges such as storm water that is a major contributor to the sediment and nutrient loadings in estuaries, rivers and the Chesapeake Bay. The NPDES Phase II program requires that the County's stormwater management program meet the following six minimum control measures:

- Public education
- Public involvement/participation
- Illicit discharge detection and elimination
- Construction site controls
- Post construction controls
- Pollution prevention/good housekeeping for municipal operations

Non-point source pollution from fertilized lawns and impervious areas are addressed by the Chesapeake Bay Preservation Act through the 100-foot buffer area requirement and water quality measures. In addition, non-point source pollution from failing septic systems is being reduced through the County's *Utilities Strategic Capital Plan* to bring public sanitary sewer to developed areas. Furthermore, the Health Department's recent adoption of stringent separation requirements between groundwater and drainfields will also help lower the bacteria counts and improve water quality. Alternative on-site sewage disposal systems approved by the Health Department and permitted by the revised Chesapeake Bay regulations may also replace failing septic systems.

Chesapeake Bay Preservation Act

To counteract the widespread degradation of the Chesapeake Bay, the Virginia General Assembly enacted the Chesapeake Bay Preservation Act (CBPA) in 1988. The general purpose of the Act is to protect the 100-foot buffer adjacent to perennial bodies of water and require that

land be managed in a manner that reduces pollutants entering the Bay by 40% by the year 2000. In 2002 revised regulations became effective and local governments were given until December of 2003 to enact local ordinance changes. Local governments are required to implement the Chesapeake Bay Preservation Act provisions since the regulation of land use and development has traditionally been a function of local government.

York County incorporated the initial regulations into its Zoning Ordinance in September 1990 and revised the Ordinance in 2004 for compliance with the 2003 regulations. In so doing, the Board of Supervisors designated certain areas of the County as Chesapeake Bay Preservation Areas, which include a Resource Protection Area (RPA), Resource Management Area (RMA), and IDA (Intensely Developed Area). The RPA includes perennial bodies of water, tidal wetlands, adjacent non-tidal wetlands, and tidal shores; a 100' vegetated buffer adjacent to and landward of these areas must be maintained. The RMA abuts and is 500' landward of the RPA or to the extent of the 100-year floodplain, whichever is greater. The IDA is an overlay that encompasses designated areas with a significant amount of impervious surface. This classification warrants utilizing these already built areas to their highest and best use prior to converting undeveloped property.

Standards for development in Chesapeake Bay Preservation Areas, previously incorporated into the Zoning Ordinance, were made a separate chapter, titled *Chesapeake Bay Preservation Areas*, of the County Code in 2005. Special development standards applicable to these areas are designed to accomplish the following goals:

- Preserving vegetation
- Minimizing land disturbance
- Minimizing impervious cover
- Controlling stormwater runoff
- Pumping out septic tanks
- Providing a reserve drainfield

In addition, to further protect the estuaries and the Bay, new waterfront developments are encouraged to provide a community pier rather than lots with individual piers.

Special development standards apply to these areas to ensure that new development will not result in degradation of the Bay. The cornerstone of the Chesapeake Bay Preservation Act is the requirement for a 100' vegetated buffer from the edge of tidal shores, tidal and connected non-tidal wetlands and perennial streams. In 2003 the Board also adopted an updated version of the County's official Chesapeake Bay Preservation Area Map. The quality of data relating to land and its characteristics has greatly improved with the development of the County's geographic information system (GIS). The map that appears in this plan gives a good depiction of the RPA, RMA, and IDA; however, the map is only to be used a general guide to the locations of CBPA areas. The new 2003 regulations require all development to perform a site-specific infield natural resources inventory to locate unmapped perennial streams, wetlands, and other areas upon which a buffer is required.

In 1995 the State initiated the Tributary Strategies program to further address the 40% pollutant reduction goal established under the Chesapeake Bay Preservation Act. Each tributary or watershed will have a strategy developed by the State to address methods to reach that goal. York County drains to three different tributaries: the York River, the James River, and the coastal area of the Chesapeake Bay. York County actively participates in the York River Watershed Forum, which monitors and advises the State on implementation of the York River Basin Tributary Strategy

On June 28, 2000, the Chesapeake Bay Program adopted a new Bay agreement, Chesapeake 2000: A Watershed Partnership that will guide the next decade of restoration in the Bay watershed. Signed by the governors of Virginia, Maryland, and Pennsylvania; the Mayor of

Washington, D.C.; the U.S. EPA Administrator; and the Chesapeake Bay Commission; this agreement rededicates efforts to the restoration and protection of the Chesapeake Bay system. The Agreement sets the following five goals to guide the restoration effort over the next ten years:

1. Living Resources Protection and Restoration
2. Vital Habitat Protection and Restoration
3. Water Quality Restoration & Protection
4. Sound Land Use
5. Stewardship and Community Engagement

York County has several initiatives currently underway that meet the goals of the Chesapeake 2000 agreement and will continue to pursue the goals as funding opportunities are made available.

Docks and Piers

As of 2005, there are approximately 1,090 private docks and piers in the County, most of them in the lower County along protected creeks and coves. High pier densities are found along Chisman Creek and sections of the Poquoson River. Potential environmental impacts of small private piers include shading, displacement of aquatic life, increased turbidity, temporary impacts from construction, and impacts relating to motorized boat use. While the individual impacts from a single dock may be relatively small, the cumulative impacts of docks and piers can be significant. For these reasons, it is preferable to have community piers serving multiple users than for each individual waterfront property owner to have his or her own private dock.

The regulation of piers has traditionally been viewed as the jurisdiction of the state. Local governments have been reluctant to regulate private piers because the state enabling authority to do so is unclear. However, York County manages pier density through the zoning and subdivision ordinances by clustering development away from shorelines and retaining waterfront common open space with a community pier. In York County, community piers are encouraged for all new waterfront open space (cluster) subdivisions. Deed restrictions recorded prior to final plat recordation, can be used to prohibit individual lot owners within such a development from having an individual pier. A second way in which local governments can control pier density is through the minimum lot size and width requirements for waterfront lots. In addition, the County can work with state permitting agencies to educate waterfront property owners about pier design techniques that will minimize environmental impacts. For example, the height of a pier above the water has been found to be the most significant factor in dock design affecting the health of submerged aquatic vegetation. Ideally, a pier should be at least nine feet (9') above the submerged bottom, should have a north-south orientation, and should be no wider than three feet (3').

One of the initiatives of the Chesapeake Agreement 2000 is to increase public access points to the waters of the Chesapeake Bay and its tributaries by 30% by the year 2010. Currently York County has seven public boat ramps, all of them in the lower County, and approximately thirteen commercial/private marinas. The Colonial National Historical Park, which is open to the public, provides a huge park setting for passive recreational opportunities and wildlife habitat. Additional public access sites are increasingly difficult to find, but the County will continue to pursue the acquisition of available surplus government and private lands. Opportunities may exist for acquisition of an additional park site along Back Creek as well as Ringfield Park, currently owned by the National Park Service, which would provide a much needed access point west of the Coleman Bridge.

The environmental impacts of additional access should be considered in the siting and design of any new facilities. Future public access points, both public and private, must be sited and developed in accordance with guidelines issued by the VMRC. The Hampton Roads Planning

District Commission has also published guidelines for the siting of boat ramps, marinas, canoe/kayak put-ins, and fishing and pedestrian shoreline access facilities, which are contained in a 1997 report titled *Regional Shoreline Element of the Comprehensive Plan*. Additional siting guidelines for boating access, beach and swimming, access pier and bank fishing, and natural area access are contained in the Chesapeake Bay Program's *Chesapeake Bay Area Public Access Technical Assistance Report*.

The County is also providing improved public access to the water through the Yorktown Revitalization project, including the Riverwalk (a pedestrian facility along Yorktown Beach) and replacement of a public wharf and pier with two new deep-water piers. The new piers accommodate deeper draft and large vessels, such as tall ships and dinner cruise boats, without dredging. Facilities are also provided for the docking of small pleasure boats for day-trippers, and an observation deck for pedestrians was completed and opened to the public in 2005. The revitalization project also includes beach stabilization and nourishment as well as the retrofitting of stormwater facilities to reduce pollutant-loading from the contributing upstream development.

Wetlands

Wetlands are commonly associated with swamps and marshes. Although most often considered to be located in tidal areas, they are also found along the floodplain, in waterways of various types, and in sheltered areas along inter-tidal coasts. Non-tidal wetlands can occur wherever there is, for at least a portion of the growing season, sufficient water to support hydrophytic plants and hydric soils. York County recognizes that wetlands are a unique and important ecosystem performing valuable functions. Specifically, wetlands store and infiltrate floodwaters, provide wildlife habitat and food sources, filter pollutants and sediment from upland runoff, and naturally control shoreline and stream bank erosion.

The management of tidal and non-tidal wetlands in York County involves federal, state and local regulatory entities. A Joint Permit Application (JPA) must be submitted for any work occurring in a wetland area. The application is submitted to the Virginia Marine Resources Commission (VMRC) for distribution to the York County staff and Wetlands Board, the Virginia Department of Environmental Quality (DEQ), the U.S. Army Corps of Engineers, and other regulatory agencies.

The general areas of tidal and non-tidal wetlands in York County are shown on the Wetlands Map. Delineation by a wetlands scientist and verification by the Army Corps of Engineers is necessary to determine with certainty whether or not wetlands exist on a property. The 820-acre Goodwin Islands comprise the County's largest tidal wetland community. They are owned by the College of William and Mary and are managed as a Natural Estuarine Research Reserve. The Grafton Ponds are non-tidal isolated freshwater wetlands located mostly on property owned by the City of Newport News, which manages the area as a part of its water supply network. Many of the County's wetlands are considered to be unique environmental features and are described by the Virginia Department of Conservation and Recreation in the *Natural Areas Inventory of the Lower Peninsula of Virginia*. Most of these areas, with the exception of Queen Creek, are in the lower County. These areas are subject to special performance standards and afforded water quality protection. For any development project, wetlands permits must be obtained prior to land disturbance.

Under the authority of the Clean Water Act, the U.S. Army Corps of Engineers regulates activities that occur in waters of the U.S. and their connected wetland. "Waters of the U.S." are defined under the "Final Rule for Regulatory Programs for the Corps of Engineers," 33 CFR Part 328. The Department of Environmental Quality implements the Virginia Nontidal Wetlands Act of 2000 and regulates activities in surface waters of Virginia. The goal of the Virginia wetlands program is to achieve "no net loss" of wetlands acreage and function. Furthermore, in order to

ensure that non-tidal wetlands regulations are enforced, the Zoning and Subdivision Ordinances require notification of regulatory agencies if wetlands exist or are thought to exist on the site. The York County Wetlands Board enforces the County's Wetlands Ordinance and has jurisdiction from mean low water to 1.5 times the tide range. Requests for shoreline erosion control structures to protect actively eroding shorelines are typical of the projects reviewed by the Wetlands Board.

It is the County's goal to protect shoreline property in a cost-effective manner that also preserves and enhances shoreline resources, water quality, wetlands, and wildlife habitat. The Wetlands Board works toward this goal by strongly encouraging applicants to obtain assistance from the Virginia Institute of Marine Science, the Virginia Marine Resources Commission, and County staff for shoreline erosion control projects. When shoreline erosion is severe and threatens structures, the Wetlands Board will consider structural shoreline stabilization methods located in wetlands of lesser ecological value. When shoreline erosion is slight to moderate, the Board encourages property owners to implement non-structural measures such as re-grading and re-vegetating. The Wetlands Board encourages coordination of shoreline erosion control projects among properties through mandatory notification of all adjacent property owners and posting of "Wetlands Permit Pending" signs and special Group Wetlands Permit. On properties with adequate separation between development and the shoreline, the Wetlands Board favors riprap revetments over bulkheads. Maximizing the vegetated buffer in accordance with the provisions of the Chesapeake Bay Preservation Act reduces the need for structural controls, which must be considered only a temporary correction for erosion problems. The goal is to direct future development and redevelopment away from severely eroding shorelines to areas that can be developed without any adverse impacts on water quality.

The *Wetlands Guidelines* (VMRC 1993) describes the tidal and non-tidal wetlands communities that exist along the County's shoreline and classifies them into seventeen community types. The communities are then ranked relative to one another and categorized into five groups for environmental value. Group One communities, for example, merit the highest order of protection because they are most closely associated with fish spawning and habitat, whereas Group Five marshes have only a few values of significance. York County fully recognizes the intrinsic value of all seventeen wetlands community types. When shoreline erosion control issues are being considered, the ranking system is a tool used in making decisions. For example, the Wetlands Board, using the Grouping System, would disapprove placement in a *Spartina Patens* (Group One) marsh if it could be moved landward to a *Phragmitis* Community (Group Five). Erosion control structures should not be permitted in wetlands if there is any alternative.

The Virginia Institute of Marine Sciences maintains a database and estimates the area of impacts from permitted shoreline erosion control structures on vegetated and non-vegetated tidal wetlands. Since 1972, approximately 0.461 acre of vegetated wetlands and 0.5 acre of non-vegetated wetlands were impacted by permitted shoreline structures.

Shoreline and Streambank Erosion

York County's shoreline consists of sheltered fine sand beaches, coarse sand beaches, exposed tidal flats, sheltered tidal flats, fringing intertidal marshes, supratidal marshes partially protected by elevation, and freshwater marshes and swamps. There are approximately 2,308 acres of marshes in the County.

Shoreline erosion is a naturally occurring process whereby forces, such as storms, the movement of the tides and sea level rise cause the boundary between land and water to recede and move inland. Erosion can contribute to the sedimentation and pollution of streams, rivers, and the Chesapeake Bay, resulting in the loss of wildlife habitat and reduced water quality and, when severe, threatening property. The increased rate and volume of stormwater runoff associated with development can accelerate the natural process of erosion.

York County encompasses approximately 207 miles of shoreline. The upper County drains via a system of streams and rivers to the southern reach of the York River. This area is characterized by rolling terrain with well-drained soils and elevations up to 100 feet above Mean Sea Level. In isolated areas, moderate to severe erosion has been noted in the VIMS *Shoreline Situation Report* (1999). The lower County drains via a system of creeks and rivers to the Chesapeake Bay. The lower County section of shoreline includes Wormley Creek, Back Creek, Chisman Creek, a portion of the Poquoson River, and the western shore of the Chesapeake Bay. Low flat lands with a relatively high water table characterize the topography of the lower County.

The impacts of natural and human activities on the shoreline can be measured by erosion rates, which are used to determine the most appropriate method to address erosion. The Chesapeake Bay Local Assistance Department suggests classifying eroding shorelines as **slight** (less than one foot per year), **moderate** (one to three feet per year), or **severe** (more than three feet per year).

In York County, the western shore of the Chesapeake Bay presents a unique challenge. The two areas with severe erosion are Reach 109 (the Bay Tree Beach area) and Reach 30 (the Waterview Road area west of the entrance to the Thorofare), both of which historically experience moderate to severe erosion rates of up to 3.5 feet per year. Although there is residential and industrial (Giant Refinery – Reach 30) development along both of these shorelines, the erosion does not appear to be associated with the development. Most of the homes were built more than ten years ago and are set back from the shoreline, although some homes along Dandy View Lane and Waterview Road are endangered. The erosion is due in large part to wave action associated with the physical alignment of the shore and prevailing storms. The Wetlands Board has approved several permits along Reach 30 for riprap, breakwaters, and marsh toe stabilization structures. The Bay Tree Beach area is much less developed than the Sandbox area. Most of these properties are not developed because the soils and the high water table preclude on-site sewage disposal systems.

The rate of erosion in the remainder of the County and along the York River is slight to moderate. The shoreline at the mouth of the river is vulnerable to the high-energy waves generated by the dominant northeast storms. The Yorktown historic area and recreational beach is along this shoreline. There is an ongoing project to stabilize the beach with a combination of methods, including riprap, breakwaters, beach nourishment, and vegetation. In addition, just south of Yorktown, the National Park Service is pursuing a project to stabilize the shoreline at the base of the significant bluff in the Moore House Road area.

The type of erosion control structure needed in a given situation is guided in part by the rate of erosion. Revegetation and re-grading are the preferred methods of non-structural erosion control in areas of slight erosion. Bulkheads and riprap are considered when the property is small and the distance between development and the shoreline precludes re-grading. Riprap revetments are typically encouraged over bulkheads because they are more effective at dissipating wave energy, have a longer life, and provide habitat for marine organisms. Evidence of a trend to use riprap rather than bulkheads is noted in **Table 2**.

The amount of bulkhead and bulkhead in conjunction with riprap decreased in York County by approximately 1,620 linear feet and the amount of riprap increased by 2,160 linear feet between 1985 and 1993 (see **Table 2**). Miscellaneous structures and the amount of unstable shoreline also declined. These trends provide positive evidence that environmentally sound shoreline erosion techniques are being implemented.

The Hampton Roads Planning District Commission's *Regional Shoreline Element of Comprehensive Plans* provides as a general guideline the following ranking of various shoreline erosion control alternatives for different wave climates:

SUMMARY OF CHANGES IN SHORELINE CONDITIONS FOR YORK COUNTY	
Shoreline Attribute	**Change, 1985-1993 (+/-Linear Meters)**
Riprap revetment	+659
Bulkhead	-252
Groin field	+176
Breakwater	+619
Groin field bulkhead	+99
Groin field/riprap	+193
Bulkhead/riprap	-241
Miscellaneous structure	-285
No structures/stable shore	+63
No structures/unstable shore	-150
Source: *Shoreline Situation Report*, Virginia Institute of Marine Science, 1999	

Table 2

Areas with a Low Erosion Rate (< 1 foot/year)	Areas with a Moderate Erosion Rate (1-3 feet/year)	Areas with a Severe Erosion Rate (>3 feet/year)
1. Vegetative stabilization with/or bank regrading	1. Vegetative stabilization with/or bank regrading	1. Relocation
2. Revetment	2. Beach nourishment	2. Beach nourishment
3. Bulkhead	3. Revetment	3. Revetment
	4. Breakwaters	4. Breakwaters
	5. Groins	5. Groins
	6. Bulkhead	6. Seawall

Table 3

Although these shoreline erosion control strategies are ranked individually, it is likely that a combination of measures is necessary depending on unique site-specific conditions. This ranking is consistent with the Chesapeake Bay Preservation Act and Virginia Wetlands Guidelines.

One of the County's goals is to protect shoreline property in a cost-effective manner that preserves and enhances shoreline resources, water quality, wetlands, and wildlife habitat. The Wetlands Board works toward this goal by strongly encouraging applicants to obtain assistance from the appropriate state agencies and County staff for shoreline erosion control projects. When shoreline erosion is severe and threatens properties, the Wetlands Board will consider structural shoreline stabilization methods provided they are located as far upland as possible and in wetlands of lesser ecological value. When shoreline erosion is slight to moderate, the Board encourages non-structural measures such as re-grading and re-vegetating. The Wetlands Board encourages coordination of shoreline erosion control projects among properties by mandatory notification of all adjacent property owners, posting of "Wetlands Permit Pending" signs and encouraging group permits. On properties with adequate separation between structures and the shoreline, the Wetlands Board favors regrading/revegetating and riprap revetments over bulkheads. Maximizing the vegetated buffer in accordance with the provisions of the Chesapeake Bay Preservation Act reduces the need for structural controls that are only a temporary correction for erosion problems. The goal is to direct future development and redevelopment away from severely eroding shorelines to areas that can be developed without adversely affecting water quality. As stated previously, there are two reaches of shoreline in York County that are classified as severely eroding, Reaches 30 and 109. The remaining undeveloped lots along Reach 30 are owned primarily by Giant Refinery and Dominion Virginia

Power, and any future development must adhere to the CBPA 100-foot setback from the edge of the eroding shoreline. Reach 109, Bay Tree Beach, is identified as an area of particular environmental sensitivity and the CBPA requirement for a 100-foot vegetated buffer area will ensure that no development occurs along the eroding shoreline.

In addition to the shoreline areas previously noted, there are streams and ditches in the County showing evidence of deterioration and erosion. Some of the streambank erosion is due to natural causes; however, some is due to upstream development and conventional ditch maintenance. Many of these streams have been identified for improvement in the County's *Strategic Capital Plan for Water, Wastewater and Stormwater*. In 2002 the Board of Supervisors formed a Drainage Advisory Committee whose purpose is to assist County staff in identifying erosion, flooding, and drainage problems and prioritizing areas for improvements. The Drainage Committee joins County staff with the citizens in a collaborative effort, thus providing a forum for public involvement and participation. Phase I of the Moores Creek Drainage project, which was prioritized through this process, is currently underway utilizing a combination of options, including stream restoration, bioengineering, regrading, revegetating, and, where necessary, piping. The County is also completing the design of a Wetlands Interpretive Center and Stream Restoration project in the Lackey area. The Lackey project promotes community involvement by partnering with the various community groups.

Stream bank erosion, like shoreline erosion, is a natural process, with many of the same negative impacts. Natural factors that contribute to stream bank erosion are steep slopes and highly erodible soils. Development on steep slopes greater than 20% should be regulated through land use controls to ensure the integrity of slopes and waterways.

Stream bank erosion is more often directly related to land use and development than is shoreline erosion. York County limits stormwater runoff from developed sites to pre-development rates through the strict application of the Erosion and Sediment Control regulations, which require that properties and waterways downstream of development be protected from sediment deposition, erosion, and damage caused by increases of volume, velocity, and peak flow rates of stormwater runoff for certain storm events. Inevitably, however, the volume and duration of stormwater runoff are increased with increased amounts of impervious area. Pursuant to the Erosion and Sediment Control Ordinance, the County requires calculations proving downstream adequacy of the channel. When possible, stream banks will be restored to a natural state using bioengineering options with contiguous floodways. Piping is considered a measure of last resort. In this manner, stormwater management, erosion control, non-point source pollutant, and habitat creation goals will be achieved. The reduction and minimization of impervious surfaces is a major issue, especially with regard to streambank erosion. Low-Impact Development and conservation design, as methods of retaining pre-development site hydrology, are extremely valuable tools that will reduce streambank erosion and protect water quality.

Shoreline and streambank erosion are significant issues for York County. The Wetlands Board is doing an admirable job of preventing shoreline erosion while limiting hardening of the County's tidal shoreline. The County is finishing a wetlands creation and streambank restoration project at Charles Brown Park in Lackey, which will serve as a pilot program for bioengineering techniques. In addition, the Stormwater Advisory Committee provides a mechanism for reviewing erosion and flooding problems to prioritize streambanks not addressed in the *Strategic Capital Plan*. The trend in the County is to favor streambank restoration and bioengineering over the conventional piping and bank hardening solutions.

Flood Zones

York County is in a tidal area with some areas in low and relatively flat terrain. Coastal flooding is a potential hazard, affecting approximately 7,000 acres of land close to coastal streams and creeks. The flat topography of the Seaford and Dandy areas resulted in flooding during

Hurricane Isabel in 2003. Through the National Flood Insurance Program (NFIP), property owners can obtain flood insurance through the private insurance industry at a reasonable cost. Communities participating in the NFIP, such as York County, have established plans and adopted regulations to lessen potential losses from flood damage. Regulations must be consistent with the NFIP. These regulations apply to those portions of a locality that are within the 100-year floodplain, which includes those areas subject to inundation by the 100-Year Flood (i.e., a flood level with at least a 1% chance of being equaled or exceeded in any year). The Flood Insurance Rate Map shows those areas of the County identified by the Federal Emergency Management Agency (FEMA) as being located in a flood hazard area. It is broken down into flood zone areas based on degree of risk.

Communities participating in the NFIP require newly constructed and substantially improved residential structures in the special flood hazard areas to have the lowest floor elevated above "the base flood level." Non-residential structures must either elevate the lowest floor or design the structure to be watertight. In an effort to reduce losses even further, York County has applied for evaluations in the FEMA "Community Rating System" (CRS). In return for implementing the criteria of the CRS, the Federal Insurance Administrator will grant small general reductions in premium rates within the community.

York County has established plans and adopted regulations to lessen potential losses from flood damage. The local regulations are consistent with the NFIP and apply to those portions of the County that are within the "100-year floodplain." (This means that there is a 1% probability of a flood occurring in any given year). The Flood Hazard Areas Map shows those areas of the County identified by the Federal Emergency Management Agency (FEMA) as being located in a flood hazard area. Newly constructed and substantially improved residential structures in the special flood hazard areas must have the lowest floor elevated above "the base flood level." Non-residential structures must either elevate the lowest floor or design the structure to be watertight. In an effort to reduce flood losses even further, the County has applied for evaluation under the FEMA "Community Rating System" (CRS). In return for implementing the criteria of the CRS, the Federal Insurance Administrator will grant small general reductions in premium rates within the community.

WASTE MANAGEMENT

Since the adoption of the *Comprehensive Plan* in 1991, and as a direct result of the recommendations contained in that plan, the County's waste management program has changed dramatically. Most significantly, the County initiated a roadside trash pickup program for all single-family detached homes through a contract with a private waste operator. Previously there had been no County trash collection; individual homeowners and homeowners' associations were responsible for contracting out with a private hauler for their trash collection. By January 2005, the curbside trash collection program had grown to encompass nearly 15,000 homes. In an effort to provide the most efficient service available, the current contract, effective January 1, 200f, incorporates automated collection in all areas possible.

A curbside recycling program was also established for all single-family homes and most townhome and mobile home communities. Regionally administered by the Virginia Peninsula Public Service Authority, this program now provides curbside service to approximately 18,000 homes. In addition, the County has expanded its drop off recycling program to include waste oil, antifreeze, batteries, paper and tires and also participates in the Collection of Household Chemicals Program. The program enable residents to dispose of various chemicals – such as paints, gasoline, brake fluid, pesticides, and drain cleaners – in an environmentally safe manner. These chemicals might otherwise be disposed of via the storm drainage system or be dumped on the ground and possibly contaminating groundwater.

During the 1997-98 leaf season a leaf and yard debris collection program was initiated. Running generally from November through January, residents may set out unlimited numbers of

clear bags of leaves and/or yard debris for collection. During the 2004-05 season, operators collected 625 tons of leaves.

Also since 1991 new Federal and State regulations have gone into effect that would have made it prohibitively expensive for the County to continue to operate a landfill; consequently, the County landfill was closed. At the landfill site, the County has constructed a waste transfer station that is leased to a private operator to receive waste and transport it to approved disposal sites outside the County. Currently, approximately 550 tons of municipal waste is processed daily. In addition, there is also a yard waste facility, operated under the direction of the Virginia Peninsulas Public Service Authority (VPPSA), which processes leaves, grass, and woody waste into mulch and compost.

York County has continued to market its recycling program in educational, household and the commercial/industrial sectors, and the success of these programs is demonstrated by the fact that in 1997 York County homes and businesses diverted approximately 42% of their municipal solid waste (including aluminum and other metals, auto bodies, newspaper, office paper, corrugated cardboard, plastic, glass, leaves and yard debris, and motor oil) from the County's waste stream, well above the State-mandated goal of 25% by 1993. When adjusted to include supplemental recycling materials – primarily coal ash bus also tires, batteries, anti-freeze, etc. – the recycling rate rises to 78%. Contracting waste services out while maintaining operational control has resulted in savings to County citizens while significantly improving the environment. A good example of this is that before the County took over responsibility for the roadside trash pickup there where often waste containers on the street three or four days a week. In most of the County the containers are out only one day per week.

NOISE

Though not generally acknowledged as a form of environmental pollution, noise has become a growing national concern with the addition of new highways and increasing air and automotive traffic. In 1972, congress passed the Noise Control Act to establish noise emissions standards for new products. The EPA coordinates federal noise research programs and determines whether noise emission standards protect the public health. Although state and local governments do not set standards, noise can be controlled through local regulations and licensing requirements. York County currently regulates noise in public areas and excessive noise from radios, horns, animals, vehicles, and performances. In addition, the Zoning Ordinance contains performance standards that limit noise to "non-objectionable" levels for certain categories of uses.

Aircraft operations are a principal source of objectionable noise in the County. Noise contours indicate the levels of aircraft noise in areas close to airport runways and are based on the average day-night sound level (abbreviated as DNL) observed in these areas. DNL is the accepted unit for determining the compatibility of noise-generating activities with different types of development. The noise contours for Langley Air Force Base indicate that there are no areas of York County where the base's aircraft operations generate unacceptable noise levels (i.e., 65 DNL).[1]For residential development, according to the Department of Housing and Urban Development, a DNL greater than 65 is considered to represent unacceptable level of noise exposure. Most of the land surrounding the Newport News/Williamsburg Airport in York County is undeveloped; however, some residential areas – including Meadowview Drive, Carraway Terrace, and areas of Lakeside Forest, Harwood Heights, Burts Road and Oriana Road – are within the 65 DNL noise contour, and parts of the Kentucky Heights subdivision are within the 70 DNL noise contour. These noise contours are likely to shrink, however, as older, louder jet engines are phased out and replaced as mandated by the Federal Aviation Administration. Moreover, according to the *Airport Master Plan* adopted in May 1997, planned runway

[1] Langley Air Force Base, *Air Installation Compatible Use Zone (AICUZ) Program, Volume I: Analysis & Recommendations*, January 1997, p. 11.

extensions will actually reduce noise exposure because of the shift in the aircraft mix from the louder military aircraft to the quieter commercial jets.

Highway traffic, particularly along major freeways and expressways such as Interstate 64, is another common source of objectionable noise in residential communities across the United States. As with airport noise, better planning for transportation/land use compatibility is the optimum solution to this problem, although in some cases where conflicts exist between existing development and major highway corridors that are planned for expansion, noise walls can help to attenuate highway noise. Pursuant to the National Environmental Policy Act, Federal Highway Administration (FHWA) regulations "require that traffic noise be mitigated when a proposed highway project is expected to produce a noise level of over 67 decibels within adjacent residential areas or certain nearby commercial areas,"[2] although ultimately the local government makes the final decision on whether or not a noise wall will be built. In York County, a noise wall is planned as part of the extension of Fort Eustis Boulevard to provide a noise buffer between the road and the adjacent Settler's Crossing residential subdivision.

CITIZEN INPUT

The citizens feel strongly that the County should place a high priority on preserving and protecting the natural environment; in the telephone survey, this was the citizens' top-ranked goal, with an average score of 4.56 on a scale of 1 to 5. Almost three-quarters of the citizens (72.2%) consider it an extremely important goal, and almost nine out of ten (88.7%) consider it important or extremely important. Preserving open space is also a high priority, ranked third overall with an average score of 4.46, as is purchasing land or development rights in order to preserve open space (4.12), which was ranked fifth overall. The Comprehensive Plan questionnaires yielded similar results. When asked what they wanted York County to look like in 20 years, many citizens responded that they wanted the County to look "green" with plenty of trees and open space. This was the most frequently given answer to this question.

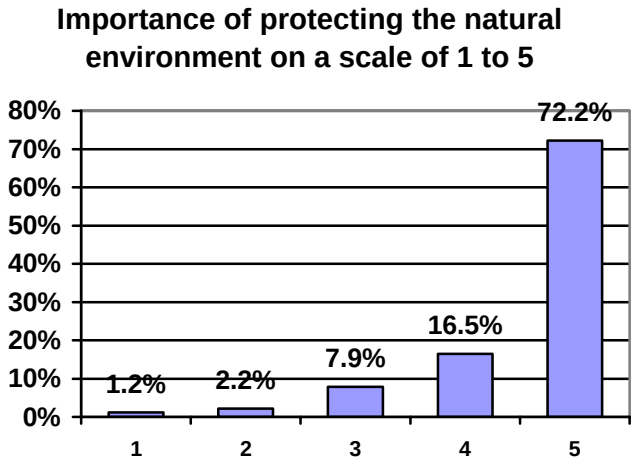

Figure 1

PLANNING ISSUES FOR THE FUTURE

It is projected that the next 20 years will bring over 6,000 new homes to the County housing almost 14,000 more residents. There will also be more businesses with more than 10,000 more employees.[3] This means more traffic and vehicle emissions, more roads, and more impervious surface. If not properly managed and regulated, growth and development can stress the delicate balance between the natural environment and the built environment. The need for strict attention to environmental protection is heightened by the diminishing supply of land in the County. When land was cheap, the undesirable sites were left alone. Now with a scarcity of land in many parts of the County, development is being considered for those sites that previously had been "passed over" because of environmental constraints.

[2] Jeffrey Grob, Concrete Examples, Planning, April 2001, p. 14.
[3] Employment as projected by the Hampton Roads Planning District Commission.

There are myriad Federal and state agencies that administer a variety of regulations to prevent degradation of the environment. It is not the role of local government to duplicate these efforts. However, the County government also has a key role in protecting the environment through the regulation of the development and use of land. Not only is land an important natural resource in and of itself, but its development and use also have a significant effect on air and water quality.

Land development is governed by various chapters of the York County Code, including the Zoning, Chesapeake Bay, and Erosion and Sediment Control Ordinances, that contain provisions to ensure the proper use, management, and protection of the vast amounts of sensitive and unique lands that contribute to the economy of the region, and the environmental quality of the County and especially the Chesapeake Bay. Among these are provisions dealing with erosion and sediment control, areas with slopes in excess of 20%, tidal and non-tidal wetlands, Chesapeake Bay Preservation Areas, and areas identified by the Virginia Department of Conservation and Recreation in the "Natural Areas Inventory of the Lower Peninsula of Virginia." In addition, the Floodplain Management Area (FMA) overlay district provisions of the Zoning Ordinance regulate construction in flood zone areas, while the Watershed Management and Protection Area (WMP) Overlay District provisions establish development standards applicable to areas of the County surrounding public water supply reservoirs.

The various environmental regulations are intended not to prohibit development but to ensure that development is sensitive to the natural environment. Development and protection of the environment are not mutually exclusive goals. *Open space* or *cluster* subdivisions, which are discussed in detail in both the Housing and Land Use elements, are a good example of a development technique that helps to preserve the intricate balance between the natural and built environment. In a cluster development, at least 40% of the gross land area is set aside as common open space for the use and enjoyment of all the residents. This allows for better protection of environmentally sensitive areas by designating them as open space to be properly maintained by the homeowners' association rather than including them within platted residential lots. The York County Zoning Ordinance permits cluster subdivisions as a matter of right in all single-family zoning districts.

In addition to regulating private development, York County is involved in protecting the natural environment through capital improvement projects. One good example is the County's sewer extension program. As noted earlier, much of the land in the County has limitations for supporting septic systems, yet many areas of the County lack sanitary sewer service and have no other option. According to the Virginia Department of Conservation and Recreation's Division of Chesapeake Bay Local Assistance, "even properly installed and maintained conventional septic systems remove less than 30% of the nitrogen from effluent. Unfortunately, septic systems are much more complicated and require more maintenance than many homeowners realize. Improperly functioning and failing exacerbate the problem of subsurface water contamination that results from the fact that conventional septic systems are not designed to efficiently and effectively eliminate nitrogen from effluent. Depending on the physical, chemical and biological characteristics of the soil, a large portion of nitrogen from septic systems may reach ground and/or surface waters, substantial contribution to the total nutrient load."[4]

The County is addressing the septic tank maintenance issue with the five-year pump-out requirement now in place. More importantly, the County has an aggressive program for extending sanitary sewer to unserved residential areas that are prioritized based on the following criteria approved by the Board of Supervisors:

- Impact on water wells,
- Impact on ground or surface water,
- Threat to the Chesapeake Bay or tributaries, and

[4] Virginia Department of Conservation and Recreation, Division of Chesapeake Bay Local Assistance, *Better Land Use Planning for Coastal Virginia*, November 2004, p.24.

- Growth factor.

These sewer extension criteria generally place highest priority on areas of the County that have one or more of the following characteristics:

- Shallow aquifer system susceptible to contamination from septic systems,
- Close proximity to fresh water systems,
- Close proximity to the Chesapeake Bay or tributaries, and
- Low potential for new development.

Sewer extension projects are identified in the County's *Strategic Capital Plan for Water, Wastewater, and Stomwater*, which is adopted by the Board of Supervisors and revised every two years; the current plan was adopted in 2005. The program is self-supporting and is funded through several sources of revenue including the connection fees charged to the residents receiving service, connection fees charged to developers, and one-half of the revenue generated by the County meals tax, which the voters approved in a referendum in the early 1990s. By targeting public sewer extensions toward environmentally sensitive areas and reducing the overall number of individual septic systems in the County, this ongoing program is the most effective means of preventing septic system pollution.

Another aspect of the County's ongoing utility extension program involves the extension of public water to areas that currently rely on wells or private water systems. As with the sewer program, areas are prioritized on the basis of a point system utilizing the following criteria:

- Septic problems in the area,
- Fire protection concerns,
- Water quality or quantity problems, and
- Growth factor.

Finally, the County has an active capital improvement program for stormwater projects. New homes and businesses will add significant impervious surface – rooftops, driveways, roads, parking lots, etc. – to a County where drainage is already a serious issue in many areas. Traditional stormwater management has focused on removing quantities of water from streets and neighborhoods, with the primary goal of preventing flooding. This water, which often carries fertilizers, pesticides, soil, and debris, went untreated and was discharged directly into area waterways. Federal and state regulations now require localities to better manage the quality of the stomwater, as well as the flow rates, that are entering creeks, streams, rivers, and bays. These regulations require much planning and educational effort to be effective, but the benefits include cleaner surface water and a healthier environment.[5]

The following criteria, adopted by the Board of Supervisors in July 1997, determine the ranking of drainage improvement projects:

- Safety problems in the area
- Potential damage/poor drainage
- Frequency of problem
- Environmental impact
- Number of properties affected, and
- Size of area affected.

County expenditures for water, wastewater, and stormwater facilities represent a significant public investment in improving the quality of our environment and the quality of life for County residents. A different approach that can yield similar benefits is for the County to fund the

[5] York County Stormwater Advisory Committee web site, Frequently Asked Questions,

preservation of open space through conservation easements or fee simple purchase. Strongly supported by the citizens throughout the preparation of this plan, open space preservation ensures that property will not be developed and thus is probably the most effective way to prevent environmental degradation.

Growth affects the environment in ways not related to land development. The Hampton Roads Planning District Commission projects that the County's population growth will be accompanied by an additional 20,000 passenger cars and trucks in the next 25 years. Traffic growth will bring more highway noise and tailpipe emissions. As noted earlier, air pollution is closely monitored and regulated by the state for compliance with the Clean Air Act. Regions that receive Federal highway funding must demonstrate that their short- and long-term transportation improvements plans conform with air quality standards set forth by the EPA. In other words, a region cannot adopt a transportation plan that causes vehicle emissions to exceed the thresholds "budgeted" to that region by the EPA. The Transportation Improvement Plan (TIP) and Long-Range Regional Transportation Plan for Hampton Roads have been found to be in conformity. As traffic in Hampton Roads continues to grow, it will be increasingly important – to continue to receive Federal transportation funds and, more importantly, to protect the quality of the air we breathe – for the County to work with the rest of the region to ensure that transportation plans are consistent with air quality goals. This will require greater emphasis on transit, carpooling, and ride sharing as well as bikeways and walkways. Land use planning strategies can also help, for example, through the incorporation of Traditional Neighborhood Design principles (discussed in more detail in the Housing element) that reduce vehicle miles of travel (VMT) by creating compactly designed mixed-used communities in which people can live, work, and recreate without ever getting into their cars.

As noted earlier, traffic causes noise pollution as well as air pollution. Noise walls are an increasingly prevalent attempt to address the issue of highway noised. However, recent research indicates that noise walls might not be as effective as is commonly believed. [6] One study of a noise wall found that significant noise reduction was limited to the area within 60 feet of the wall and that beyond 200 feet noise reduction is caused more by distance from the highway than by the wall itself. In addition, whatever noise benefits result from such walls must be balanced against the cost – estimated at $20 per square foot or about $40,000 per affected home – and the aesthetic impact, which can be severe. Technological solutions to the problem of highway noise – such as rubberized pavement, low-noise tires, and a high-tech option known as "noise cancellation"[7] – are also being studied.

In York County, the only likely candidate for noise walls is Interstate 64, where the planned widening will increase noise impacts on existing (Springfield Terrace, Queens Lake) and planned (Felgate's Woods) residential development in the County. The best solution to the problem of highway noise is to implement appropriate land use controls to prevent residential development and other noise-sensitive uses along major freeways such as I-64, and in the future the County should discourage or prohibit such development to the extent possible.

Another way in which the County is involved is through its public investment decisions, for example, by …or by ensuring that public facilities, such as schools and libraries, are located and designed to avoid impacts on environmentally sensitive areas. In these ways, the County can complement ongoing Federal and state efforts in the area of environmental preservation.

[6] Kim Sorvig, "A Sound Solution? Expressway noise walls can fix some community problems – while causing others." Planning, April 2001, pp 10-15.
[7] Sorvig, p. 15.

GOAL, OBJECTIVES, AND IMPLEMENTATION STRATEGIES

Goal

Establish and preserve a balance between York County's natural and built environment that contributes positively to the quality of life of current and future generations.

Objectives

GENERAL

1. Preserve and protect environmentally sensitive areas and natural resources from the avoidable impacts of land use activities and development.

2. Enhance public awareness and understanding of the importance of environmental conservation and preservation.

3. Continue to implement special development regulations to protect natural resources areas, including low-lying areas, areas with steep slopes, tidal and nontidal wetlands, Chesapeake Bay Preservation Areas, and areas identified by the Virginia Department of Conservation and Recreation, Division of Natural Heritage in the Natural Areas Inventory of the Lower Peninsula of Virginia.

AIR

Achieve and maintain regional attainment with the National Ambient Air Quality Standards.

LAND

1. Ensure that land development occurs in recognition of the ability of the land to support such development without environmental degradation.

2. Preserve open space for purposes of wildlife habitat and the preservation of ecologically sensitive areas.

WATER

1. Ensure the conservation and enhancement of adequate and safe future water supply areas.

2. Ensure existing and proposed public and private access facilities (docks and piers) do not have a negative impact on water quality.

3. Protect coastal wetlands, marshes, rivers, inlets and other bodies of water from degradation associated with land development.

4. Protect shoreline property from erosion in a cost-effective manner that preserves and enhances shoreline resources, water quality, wetlands, riparian buffers, and wildlife habitat

5. Minimize the need for streambank and shoreline erosion controls.

NOISE

1. Limit noise associated with nonresidential development and highway traffic.

2. Promote compatible land use and development in areas where aircraft noise exceeds acceptable levels as determined by the Department of Housing and Urban Development.

WASTE MANAGEMENT

1. Achieve a 50% recycling rate.

2. Provide for the convenient, efficient, and safe removal and disposal of leaves and yard debris.

3. Expand markets for recycled and recyclable products.

Implementation Strategies

GENERAL

1. Continue to require that development plans identify environmental constraints and opportunities and show how unavoidable environmental impacts will be mitigated.

2. Continue to require a natural resources inventory to identify environmentally sensitive areas and natural resources prior to any development.

3. Consider using public properties, such as parks and watershed areas, as living laboratories to educate school children about environmental conservation and preservation with such activities as nature hikes and observations, environmental experiments, wetlands delineation activities, etc.

4. Collaborate with civic groups and community organizations on environmental restoration projects to encourage stewardship.

5. Continue to support the Drainage Advisory Committee and provide educational materials concerning environmental conservation and preservation.

6. Encourage the School Division to provide a meaningful Bay or stream outdoor experience, such as a field trip, for public school students in accordance with the Chesapeake 2000 Agreement.

AIR

1. Continue to support regional air quality initiatives through active participation in the Hampton Roads Air Quality Committee and the Interagency Consultation Group for Hampton Roads.

2. Continue to discourage the recruitment of industries that emit high levels of air pollutants.

3. Promote transportation modes and strategies that reduce the number of vehicle miles of travel (VMT) on the region's road network, including mass transit, HOV lanes, ride-sharing, bicycling, and walking.

4. Work with VDOT to identify and pursue regional funding (through the Congestion Mitigation and Air Quality program) for transportation improvements – such as intersection improvements, coordination of traffic signal systems, ITS projects, bikeways, and transit – that reduce auto emissions.

5. Continue to prohibit the open burning of leaves and yard debris in proximity to homes and other structures.

6. Pursue activities and strategies, including public education efforts, that decrease air pollutants within the Hampton Roads region.

LAND

1. Promote site design and land development that blends appropriately with natural features and terrain.

2. Retain natural physical features, forests, and woodland areas throughout the development process.

3. Maintain open space requirements within developing areas.

4. Maintain tree preservation and landscaping requirements for all new development.

5. Working with land conservancies, such as the Virginia Outdoors Foundation and the Williamsburg Land Conservancy, contribute funding for the purchase of conservation easements as a means of protecting and preserving areas with desirable or sensitive environmental or aesthetic qualities, especially shoreline, Resource Protection Areas and groundwater recharge areas.

WATER

3. Identify potential sources of groundwater and surface water contamination and develop mitigation plans and procedures.

4. Monitor the septic tank pump-out program and pursue criminal penalties for non-compliance.

5. Continue enforcement of the requirements of the Watershed Management and Protection Area Overlay District including water quality and vegetative buffers to protect potable water reservoirs.

6. Support the Virginia Department of Environmental Quality's mandate to prevent destruction of non-tidal wetlands understanding they are important groundwater recharge areas.

7. Continue to require appropriate construction methods to control sedimentation, pollutant loading, and stormwater runoff, especially where development takes place in close proximity to water bodies.

8. Ensure that redevelopment of existing waterfront facilities will reduce non point source pollution and proposed shoreline access will address water quality issues consistent with the Chesapeake Bay Preservation Act.

9. Encourage community piers and commonly owned shoreline open space in new waterfront housing developments.

10. Adopt policies to implement the Hampton Roads Planning District Commission (HRPDC) Regional Shoreline Study.

11. Implement the guidelines in the Virginia Marine Resources Commission Shoreline Development BMPs Handbook for construction methods and siting criteria.

12. Consult the Marina Technical Advisory Program (MTAP), available through the Virginia Institute of Marine Science, on marina siting and design issues related to best management practices, water quality, and technical support for marinas.

13. Monitor and develop clean-up strategies for illicit discharges.

14. Continue the implementation of the re-inspection program of Best Management Practices.

15. Continue to enforce the conditions of the County's stormwater discharge permit in accordance with the NPDES Phase II program.

16. Develop and adopt a stormwater management ordinance with water quality requirements.

17. Continue to rigorously enforce the Erosion and Sediment Control Ordinance to reduce sedimentation and degradation of surface waters.

18. Continue to participate in the York River Tributary Strategies effort as a means of improving water quality.

19. Reduce the non-point source pollutant loading from stormwater runoff on County projects and use indigenous and low-maintenance landscape materials.

20. Continue to participate in the Household Chemical Collection System to encourage the safe disposal of chemicals that might otherwise be disposed of via storm drains and dumping.

21. Encourage property owners to utilize nonstructural erosion control measures, such as re-grading and re-vegetation, to address slight to moderate erosion and to utilize structural measures when erosion is severe and threatens property.

22. Encourage the coordination of shoreline erosion control measures among adjacent property owners.

23. Ensure that vegetative buffers are retained, enhanced, or established.

24. Ensure that drainage patterns are not altered to concentrate stormwater flow in erodible streams.

25. Encourage Low Impact Development and conservation design to reduce impacts to receiving downstream resources.

26. Ensure the provision of required buffers on all perennial streams.

NOISE

1. Continue to employ Zoning Ordinance performance standards and other regulatory controls where applicable to minimize noise impacts of nonresidential uses on residential areas.

2. Consider the establishment of sound attenuation zoning, as provided for by Section 15.2-2295 of the *Code of Virginia*, to require installation of acoustical treatment measures in residential buildings and structures in areas within the aircraft approach zones for Newport News/Williamsburg International Airport where average noise exposure is 65 DNL or higher.

3. Discourage construction of schools and other noise-sensitive uses, such as hospitals and nursing homes, in areas within the aircraft approach zones for Newport News/Williamsburg International Airport where average noise exposure is 65 DNL or higher.

4. Consider incorporation of noise walls in the widening of Interstate 64.

5. To the maximum extent feasible, prevent construction of homes and other noise-sensitive uses in proximity to the Interstate 64 corridor.

WASTE MANAGEMENT

1. Encourage recycling by both households and businesses as the preferred means of waste disposal.

2. Aggressively advertise in local newspapers and the Citizen News the County's solid waste management programs both to inform residents and businesses of program offerings and to educate those already participating in the program.

3. Expand the list of recyclable items based on participant input and/or market fluctuations.

4. Expand information/education campaigns to instruct the public on the need for recycling by providing materials to interested businesses, civic and homeowners' associations and any interested party.

5. Continue to incorporate recycling education into the public school program from elementary school through high school.

6. Continue to work with the Virginia Peninsulas Public Service Authority (VPPSA) to organize household hazardous waste collection days for materials such as old paint cans, paint thinner, fertilizers and pesticides, etc.

7. Continue the ongoing public information campaign to educate citizens in proper methods of recycling yard waste.

8. Develop a program to publicly recognize and acknowledge "model" yard waste recycling programs by neighborhoods, groups, and individuals.

9. Continue the County purchasing policy emphasizing the purchasing of supplies, where economically feasible, that are made of recycled products and/or are recyclable themselves.

10. Aggressively market the products of the regional composting facility, including bagged compost material for sale to residents who do not own trucks.